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Issue Paper

Acquiring Energy Efficiency More Efficiently

Introduction

Can electric utilities continue to acquire the efficiency resource in the ways that have been employed since the early 1980s, or are there potentially more efficient and effective ways to secure energy savings that should be given serious consideration? That is the question this paper explores.

Energy conservation programs have been a success in the Northwest. In the last 15 years the electric utilities in the Northwest captured nearly 800 average megawatts of energy-efficiency improvements through conservation programs. These energy savings cost significantly less than alternative electrical resources available during that period.[1]

In addition, there were significant efficiency gains attributable to improved residential and commercial energy codes. During this decade, the two most populous states in the region, Oregon and Washington, and several local jurisdictions in Idaho and Montana, adopted energy codes for new residential and commercial buildings that are the among the most rigorous in the nation. These codes will result in several hundred megawatts of savings. Utility support has been critical to implementing these codes.

At the federal level, minimum efficiency standards were established for major residential appliances. Also at the federal level, the National Energy Policy Act of 1992, established new efficiency standards for some lamps, lighting equipment, electric motors, commercial heating, ventilating and air conditioning equipment and shower heads. These standards will result in savings that do not have to be sought through utility programs.

The Council estimates that these local, state and federal codes and standards have already contributed an additional 150 average megawatts of savings.

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[1] *The Green Book:Tracking Pacific Northwest Electric Utility Conservation Achievements 1978 - 92.* May 26, 1994. Northwest Power Planning Council. Document No. 94-18.

The Northwest Power Planning Council's 1991 Power Plan sets an ambitious goal of an additional 1,500 average megawatts of cost-effective efficiency savings by the end of the decade. So far, the Council's tracking effort indicates that the region is on the path to achieving its conservation goals. Efficiency continues to be an attractive resource. Nearly one half of it is available for less than two-thirds of the cost of a new combined-cycle combustion turbine. It is environmentally benign. It is not subject to the risks of increasing fuel prices.[2] Based on a Council staff analysis, even with natural gas price escalation rates at approximately 40 percent below those used in the 1991 plan, the acquisition of conservation resources of this magnitude remained regionally cost-effective. Analysis conducted by the Council also shows that if 30 percent of the energy savings now called for in the plan fail to materialize, the present value cost to the region would be approximately $1.8 billion higher.[3]

Despite the successes of the past decade, there is reason to question whether the region can continue to acquire energy savings in the ways employed since the early 1980s. The changing utility environment may call into question the means by which we acquire the conservation resource.

There are two key factors in this new environment. First, the benchmark resource with which efficiency must compete is no longer a capital-intensive, long lead time, inflexible and expensive coal plant that costs two to three times more than the average efficiency resources. Now the competition is a low capital cost, short lead time, highly flexible and relatively clean natural gas-fired combustion turbine. The levelized cost of power from a combustion turbine is not much more than the cost of the average efficiency resource. At the very minimum, this implies that developers of efficiency must be very cost-conscious if they wish to compete.

In addition, because combustion turbines have low capital costs and the utility's revenues are not reduced as they are with conservation, there will be slightly smaller impacts on rates with combustion turbines than with efficiency. Because the costs of the conservation are essentially all front-loaded capital costs, the rate impact of the conservation will be greatest in the near term. However, as gas prices rise, the power from combustion turbines will begin to be more expensive than most efficiency resources in the long run.[4]

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[2]The economic benefits of conservation are, however, sensitive to fuel price decreases. See Council document 94-30, *Exploring Additional Power Planning Considerations.* August 10, 1994.

[3]See *The Implications of the Current Gas Price Outlook for Conservation Targets - Status Report.* October 7, 1992. Northwest Power Planning Council.

[4]Council staff analysis revealed that if 855 average megawatts of conservation at the average cost identified in 1991 Plan were acquired rather than new gas-fired combined cycle combustion turbines the average *retail rate* of a hypothetical investor owned utility would be roughly 4.5 percent or 2.0 mills per kilowatt-hour higher in real terms for the first 10 years of a 20 year planning period. However, this hypothetical utility's consumers would have a total *bill* for electricity that is $0.2 billion lower in present value terms over this same 20 year planning period. Viewed over a planning horizon of 30 years, the present value bill savings to the utility's customers would nearly $3 billion. See *Exploring Additional Power Planning Considerations.* Document 94-30, Northwest Power Planning Council, August 10, 1994.

The rate impacts of conservation interact with the second major factor in the changing utility environment -- increasing utility concerns about their competitiveness. As the utility industry restructures itself in response to ongoing technological and regulatory changes, many utilities are becoming concerned about their ability to be competitive suppliers. This is certainly the case with the Bonneville Power Administration's concerns about being a competitive wholesale supplier of electricity. It is also a concern for some retail utilities that fear the loss of major industrial or commercial customers to lower-price power providers. Some are beginning to question whether demand-side management can be sustained in a more competitive utility environment.[5] Will utilities concerned about near-term rate competitiveness continue to invest in a long-term resource like efficiency?

The Challenge: Maximize Efficiency Gains While Minimizing Costs

The current approach of utility efficiency programs evolved in the early 1980s. It is retail incentive-oriented, house-by-house, building-by-building, factory-by-factory. Utility conservation programs are designed to overcome market barriers to retail customer investments in conservation. Retail customers were first offered consumer education about their energy use, in the hope that better information would stimulate efficiency improvements. When utilities recognized that information alone was inadequate to garner sufficient energy savings, they began offering financial assistance in the form of low-interest or no-interest loans to improve the economics of consumer conservation investments. Consumers are now being offered a wide range of rebates and grants if they purchase and install more efficient water heaters, lights, ballasts, motors, heating, ventilating and air conditioning equipment and other major appliances.

These approaches are both capital and staff intensive. To achieve high penetration rates, utilities must directly and successfully intervene in millions of consumer decisions. When few utilities were undertaking aggressive conservation acquisition efforts, targeting individual consumers in one's own service territory was a logical response. However, in an era where many utilities are undertaking demand-side management programs, it is now possible to consider whether collectively utilities can achieve some economies of scale in their conservation acquisition efforts through market intervention at other than the retail level.

Re-Inventing Conservation Acquisition

An alternative approach for acquiring the energy-efficiency component of an energy service is to first ascertain where the utilities' best buys can be obtained. This approach divides the energy-efficiency market into two sources of supply, 1) equipment -- for example, lights, motors, appliances; and 2) systems -- for example, complex buildings, industrial processes. Once the best buys from each of these sources have been determined, then utilities can exercise their collective power as consumers seeking to purchase energy efficiency to alter the marketplace. The strategy for acquiring energy efficiency outlined below is designed to capture energy-efficiency improvements in equipment through market transformation ventures. It focuses utility customer contact

[5] For example, see Studness, Charles M., "Utility Competition, DSM and Piano Bars: The Fatal Flaw," *Public Utility Fortnightly,* August 1, 1993, pages 35-37.

programs on the acquisition of efficiency gains available from improving a customer's energy service systems.

Electric energy use in the residential and small commercial market is dominated by the efficiency of individual pieces of equipment in a very large number of installations. Even in a typical electrically heated home, approximately half of the electricity used is consumed by water heating, lighting and other appliances.

Rather than try to influence each of those large numbers of individual decision makers to buy efficient equipment, it may be less costly and more effective to transform markets such that only efficient equipment is available. The efficiency of the installed base of this end-use equipment will improve over time as the existing stock is retired. Even if a utility has an immediate need for new resources, it may be more cost-effective to allow natural appliance stock turnover to drive the efficiency gains in these small end uses rather than incur the relatively high administrative cost of obtaining the savings if done site-by-site. Similarly, efficiency gains in the equipment employed by large commercial and industrial customers (for example, motors) can also be obtained as the equipment is replaced.

On the other end of the spectrum, there are large efficiency gains that can be achieved by improving the *energy service system* when the equipment is being replaced (or added). For example, replacing a large, old, inefficient motor with a new efficient one may result in a 2-to-3 percent gain in efficiency. However, it may be possible to achieve a 10-to-20 percent improvement in efficiency by replacing the old motor with a new high efficiency one <u>and</u> a variable speed drive. Even greater savings may be achieved when process changes are undertaken.

The number of these opportunities is relatively small compared to the numbers in the residential and small commercial markets, and the degree of staff involvement required is high. But the individual payoffs can be quite large. This approach also gives the utility the opportunity to provide much better service for its key customers.

This strategy consists of five elements:[6]

1. Transform new equipment markets through deliberate utility, government and industry collaboration.

2. Transform building design and construction practices by deliberate coordination of government actions and utility programs.

3. Concentrate utility demand-side management efforts on improving the system efficiencies of those customers who are most sensitive to the cost of electric energy services.

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[6]This strategy is aimed at reducing the "total cost" of conservation. Approaches that could reduce the cost of conservation to utilities are discussed in Council issue paper 94-46, *Sustaining Conservation in the Era of Competition. September, 1994.*

4. Expand the energy service delivery system through partnerships with product manufacturers, distributors, designers, architects, engineers and other trade allies.

5. Market energy efficiency to customers as part of a package of energy services (e.g. power quality, environmental compliance, improved productivity, better quality working conditions, etc.) so that utility involvement adds multiple benefits for the customer.

1. Transform the Market for New Equipment Through Deliberate Utility, Industry and Government Collaboration.

The market for energy services is made up of customers who make choices among combinations of equipment and fuels to deliver the energy services they desire. For our purposes, a market transformation would make more efficient products, processes and practices widely available and used. These changes may be the results of programs that educate and demonstrate the benefits of energy-efficiency improvements, changes in technology that create new products, or changes in demand sufficient to dramatically alter the price and availability of products.

Market transformation ventures target equipment manufacturers and distributors or appliance standards and building codes to achieve wholesale change in the market rather than site-by-site energy savings. At least two large-scale market transformation strategies have been implemented in the United States. The first strategy is designed to transform the efficiency of a specific manufactured product through coordinated consortium purchases. The second strategy seeks to transform building practice through coordinated utility programs and government actions.

Examples of efforts to transform the energy efficiency of manufactured equipment through deliberate coordination of utility purchases include the Northwest's Manufactured Housing Acquisition Program (MHAP) and the national Super Energy-Efficient Refrigerator Program (SERP). Rather than provide rebates to individual consumers who purchase a new energy-efficient manufactured home or new energy-efficient refrigerators, utilities banded together to purchase the energy efficiency "factory direct." This approach has five advantages over programs that offer customers rebates for efficiency purchases.

First, by offering an incentive directly to the manufacturer, rather than to retailers, distributor and retail markups are reduced, keeping unit costs down.

Second, substantially higher market penetration can be accomplished at a much reduced administrative cost. For example, only 18 manufacturers and 30 utilities had to agree to the terms of the manufactured housing program instead of 12,000 home purchasers each year. Once manufacturers agreed to produce only energy-efficient structures, utilities could eliminate costly marketing efforts and related administrative overhead.

Third, when the program results in a substantial increase in market penetration, some of the components that are used to make the equipment more efficient may be reduced in price due to economies of scale. Through the manufactured housing program, for example, the cost of high performance windows came down 40 percent. Insulation costs dropped 30 percent.

Fourth, once resources are captured through market transformation programs, utilities can devote more of their scarce resources to other conservation efforts that require direct customer contact. For instance, instead of maintaining extensive lighting equipment rebate lists and processing rebate claims, utility and trade ally staff can allocate more of their time to helping customers develop more efficient lighting systems.

Finally, by targeting market transformation efforts on equipment that is subject to state or federal standards, it may be possible to reduce or eliminate the need for continued utility financial assistance. One of the explicit purposes of the efficient refrigerator program, for example, is to demonstrate an advanced energy-efficient and "environmentally friendly" refrigerator prior to the next revision of the federal appliance efficiency standards. Similarly, the manufactured housing program demonstrated that highly energy-efficient manufactured homes could be built on a production line and be designed with features the consumers accept. This customer acceptance refuted arguments against increasing the stringency of new federal energy standards for manufactured housing.[7]

On the other hand, there are at least four potential pitfalls to implementing the wide range of market transformation ventures needed to capture all cost-effective conservation: one is political, one practical, one is institutional and the fourth is legal. Generally speaking, it is unlikely that all utilities would need to participate in a market transformation venture for it to be successful. Non-participants will be able to take advantage of the impact of the joint actions of others without incurring any of the costs. In a rather perverse sense, then, there is a possibility that some utilities will establish a new form of "free ridership." In fact, in both SERP and MHAP there are non-participant utilities that benefit without paying their share of the costs. Such inequity is acceptable if the only alternative to acquiring the energy efficiency through market transformation is for each individual utility to incur much higher costs, operate retail programs for longer periods or both.

On the practical side, significant effort will be needed to establish accurate methods for tracking the costs and benefits of collaborative programs. Each utility should only pay for and be credited with those efficiency gains that accrue in its service territory. Since utilities will be required to develop methods to track the impact of their conventional demand-side management programs, a more coordinated approach should not require substantially more resources. Indeed, there may be economies of scale achieved by establishing one tracking system for a particular type of equipment (e.g. compact fluorescent lights, high-efficiency refrigerators, motors, ballasts, etc.) for multiple utilities, instead of having each utility develop its own independent system. This is particularly true if the existing industry's inventory tracking system can be modified to carry out this function.

The institutional factor that could constrain investments in market transformation ventures by investor-owned utilities is the treatment of these investments by their regulatory commissions. By design, the majority of the benefits derived from successful market transformation accrue over a long period of time, while the investments may be

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[7]When the U. S. Department of Housing and Urban Development adopted its revised thermal standards for new manufactured homes in the fall of 1993, it cited experience in the Northwest several times as evidence for the feasibility of achieving the new standards.

made up front. Historically, utility regulators have required cost-effectiveness calculations that match current-year costs against current-year savings. Regulators must be willing to adopt policies that accept (and perhaps promote) the prudency of investments in market transformation efforts that may not generate immediate "cost-effective" savings, but do return very economical efficiency gains when long-term market changes are taken into account.[8]

The fourth factor that may hinder market transformation ventures is that someone may view such collaborative efforts as restraint of trade or price fixing. Such charges could be dismissed if the market transformation venture is carried out through an open and competitive process. Moreover, since the utilities are buying only the energy-efficiency component of a product, they do not dictate the price a supplier charges the consumer. For example, under the manufactured housing program, the region's utilities purchase $2,500 worth of energy savings from each new electrically heated manufactured home built for the Northwest. The price the manufacturers charge dealers for these homes is negotiated between the manufacturers and the dealers. The price the dealer charges the home buyer is also agreed to through independent negotiations.

A national consortium of utilities, federal agencies and environmental groups, the Consortium for Energy Efficiency (CEE), has formed to identify and pursue similar market transformation ventures. The Western Utility Consortium (WUC), comprised of utilities and other interested parties from California and the Northwest, has formed to pursue projects of a more regional nature. Over the course of the next 10 years, federal efficiency standards for 15 residential appliances and more than a dozen types of commercial scale equipment and appliances will be established and/or updated. Table 1 shows the U.S. Department of Energy standards rulemaking schedule. Each of these processes represents an opportunity for utilities, acting in concert with government and industry, to secure energy efficiency at a reduced cost to the utility system compared to retail rebate programs.

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[8]The issues surrounding how utilities might be credited for their market transformation programs are beginning to be addressed by regulatory commissions. See Schlegal, Jeff. *Evaluating and Measuring Market Transformation Effects.* Presented at the NARUC Summer meeting. San Diego, CA. July 25, 1994.

Table 1

Efficiency Standards Established under the
National Appliance Energy Conservation Act of 1987 (as amended in 1988)
and the Energy Policy Act of 1992

Product / Initial Standard	Effective Date of Legislated (Actual)	Revisions
Refrigerator and Freezers	1990	1993/98/2002
Clothes Washers	1988	1994/98
Clothes Dryers	1988	1994/98
Dishwashers	1988	1994/98
Ranges and Ovens	1990	1995 (98)
Water Heaters	1990	1995 (98)
Room Air Conditioners	1990	1995 (98)
Central Air Conditioners	1992-93	1999/2006
Heat Pumps	1992-93	1999/2006
Furnaces and Boilers	1992	2002
Direct Heating Equipment	1990	1995/2002
Pool Heaters	1990	1995 (98)
Ballasts for Fluorescent Lamps	1990	1995 (98)
Fluorescent Lamps	1994-96	Revision schedules
Reflector Incandescent Lamps	1996	to be determined
Electric Motors (1-200 horsepower)	1998-2000	“
Packaged Commercial Air Conditioners and Heat Pumps	1995-96	“
Commercial Water Heaters	1995	“
Commercial Furnaces and Boilers	1995	“
Showerheads	1994	“
Faucet Aerators	1994	“
Toilets and Urinals	1994-97	“

Not all energy service equipment is covered by national standards. Also, in some instances, the date the standards take effect does not correspond to the utilities need for energy savings. Under these circumstances, it may be necessary to establish joint utility programs to purchase the energy efficiency until the standard takes effect or the market for the product has been transformed. Moreover, because federal appliance efficiency standards are based on consumer economics, it is possible that even revised standards may not capture all the energy savings that would be cost-effective to utilities. Therefore, short-term manufacturer arrangements may need to be extended to garner any additional cost-effective savings.

Two types of collaborative purchases can be used to reduce the cost of energy efficiency improvements. The most straightforward is to purchase the energy-efficiency component of some commodity that is already being supplied to the marketplace. For example, the efficient refrigerator program will make payments to the manufacturers of refrigerators that won the competition. Note that the payment is to the *manufacturer* not the retail buyer. Where possible, the manufacturer should handle the administrative burden of tracing its production to the final customer, not the utility. The primary targets for joint purchases are markets where competition is already strong, hence margins are low, and the more efficient products are commercially available, but carry a price premium. For example, nearly all of the items that show up on the lighting and equipment retail rebate lists of utilities in the Northwest could be bought less expensively from manufacturers than retailers.

Utilities collectively purchase (or lease) significant quantities of office equipment, including computers, printers, telecopiers and photocopiers. As a first step, the region's utilities could agree to buy equipment that satisfies the specifications adopted by the Environmental Protection Agency's *Energy Star* program for computer equipment. By buying efficient equipment for themselves, utilities can add their market power to the federal government's to increase the availability and perhaps reduce the cost of more efficient office equipment.

Some demand-side management measures produce savings and benefits for other kinds of utilities. For example, energy-efficient shower heads and horizontal axis clothes washers reduce water and wastewater treatment demands. To expand the bulk purchasing power of the electric utilities, water and sewer utilities could collaborate with electric utilities on such water-related market transformations. For example, in the Seattle area, electric utilities, the gas utility and local water utilities participated in a joint effort to distribute energy-efficient shower heads.

2. Coordinate Utility Programs and Government Actions to Transform Building Design and Construction Practices to Meet Higher Levels of Efficiency Through Improved Codes and Standards

The use of coordinated government actions and utility programs appears to be the most cost-efficient strategy for acquiring conservation savings in new buildings. This strategy has already been demonstrated. When the Council adopted its first regional power plan in 1983, it called upon the Northwest's state and local governments, the Bonneville Power Administration and utilities to initiate three programs whose goal was to dramatically change residential building practices. One was a demonstration program designed to develop cost and performance data for the new standards as well as give builders experience in building to the standards, another program, the Northwest Energy Code program, was designed to encourage state and local governments to adopt substantially more-efficient energy codes. The third program was a utility marketing program (Super Good Cents) to encourage builders to voluntarily adopt energy-efficient building practices.

The three programs were designed to complement one another. Where there were opportunities that made it possible to adopt the new standards as a local energy code, they could be seized. Where individual builders or buyers wanted to build to the new standards, they could do so with the assistance of their utility. Under both the code adoption program and the utility marketing program, payments were made to the home buyer to cover some of the increased cost of building to the higher levels of energy efficiency. Utilities also covered increased building code enforcement costs for local governments.

As a result of these three programs, approximately 85 percent of the new electrically heated, single-family residential construction and 90 percent of the new electrically heated multifamily construction in the Northwest is now covered by energy codes that reduce space heating requirements by more than half of what they are in houses built to codes in 1983. This market transformation was accomplished in less than six years.

This approach continues to be applicable to new residential and commercial buildings where regionally cost-effective savings have been identified. However, these programs have been the subject of two criticisms. The marketing element of this strategy (Super Good Cents) has been accused of paying for “free riders.” It has been asserted that many participants in this program would have built an energy conserving home with many of the same efficiency measures whether the program -- with its financial incentives -- existed or not.

In response to this argument, it should be noted that the primary objective of the program is a long-term market transformation rather than just immediate acquisition of savings. One measure of the success of this strategy is that energy codes rigorous enough to capture all energy savings that are economical for consumers have subsequently been adopted in large portions of the region. Super Good Cents was also effective in helping a significant fraction of the building industry (and its suppliers) gain familiarity with the techniques and products needed to meet the new efficiency standards. As a result of Super Good Cents and the Northwest Energy Code programs, roughly 25 percent of new electrically heated Northwest homes were already being built to the standards when the standards were adopted as statewide codes in Oregon and Washington. (For a more thorough discussion of the economics of these programs viewed from a market transformation perspective see Schwartz, Howard, et al. *Getting to Code: Economic Costs and Benefits of Implementing Washington State’s Residential Energy Code.* WSEO 93-185. Washington State Energy Office, Olympia. July 1993.)

The second criticism leveled against the Northwest’s strategy is that it has relied on the utility industry to provide financial support for energy code enforcement. The utilities have argued that building permit fees should be raised to cover the increased cost, if any, of enhanced energy code enforcement. Just as ardently, local and state governments, already financially strapped, argue, that if utilities want better control of the energy features of new buildings they should provide support for accomplishing the task. This issue must be resolved if the Northwest is to continue to rely on codes as a mechanism for transforming the energy efficiency of new buildings.

Market transformation of site-built housing through the use of better codes and utility programs might be made even more effective if existing market players can be induced to cooperate in the effort. The Federal National Mortgage Association (Fannie Mae) has begun to discuss with investor-owned utilities the possibility of providing the capital for carrying out residential conservation programs. This could provide lower-cost capital for many utilities.[9] Additionally, utilities could help provide more attractive financing for either retrofitting existing properties or buying energy-efficient new properties if they pooled their retail program dollars to “buy down” interest rates for homes or commercial buildings that meet certain energy-efficiency standards. This would make energy-efficient properties more affordable, while encouraging the existing financial community to market the availability of these lower-interest loans, potentially reducing the need for utility marketing efforts.

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[9]Fannie Mae has initiated two programs in cooperation with Pacific Gas and Electric. In one program Fannie Mae provides financing for an energy service company’s retrofit of existing multi-family buildings. In the second program, Fannie Mae serves as a secondary market for unsecured loans for Pacific Gas and Electric customers who retrofit single family homes to the utilities standards.

Action at the federal level to effectively implement both an energy-efficient mortgage program (EEM) and a home energy rating system could also help transform the market for energy-efficient residential building. Energy-efficient mortgage programs allow home buyers to qualify for larger loans to pay for the additional cost of conservation measures installed in homes. Although these programs are now available, they are not widely advertised and rarely used. The Clinton administration's Climate Action Plan places a high priority on gaining greater use of energy-efficient mortgages.

3. Concentrate Utility Demand-Side Management Efforts on Improving the System Efficiencies of Those Customers Who are Most Sensitive to Increases in the Cost of Electric Energy Services

Not all customers are equally sensitive to the cost of electric energy services. For example, residential and small commercial customers' lighting and refrigeration services are not subject to competition from alternative electricity providers. Large commercial and industrial customers, however, have co-generation and self-generation alternatives that may be more economically attractive than continued electricity purchases from a utility, or they may be able to get lower price service from an adjoining utility.

Utilities can address the real or perceived competition from alternative electric energy service providers by focusing their direct staff efforts and the work of their trade allies on improving the energy using systems of their large commercial and industrial customers. Their are two reasons for focusing on these customers. First, the cost of the savings will be lower because the efficiency gains achieved in large commercial and industrial facilities have proven to be less expensive than in other market segments. This translates into less upward pressure on rates. Second, in industrial facilities, the efficiency gains reduce the electricity used per unit of production. Because this reduces the potential impact of rate increases on an industrial customer's total bill for electricity, it also lessens attractiveness of switching to an alternative energy service provider.

Equipment employed in large commercial buildings or industrial facilities may be subject to market transformation ventures. For example, the Consortium for Energy Efficiency is presently conducting research to assess the feasibility of establishing a market transformation program for energy-efficient motors. However, the efficiency of the electric energy service systems of these large customers cannot be reached through market transformation ventures. Improving the energy efficiency of industrial processes and complex lighting, heating, ventilating and air conditioning systems requires specialized on-site expertise. Moreover, experience has shown that changes in these systems are often only undertaken when the customer trusts the utility. Typically, this trust is developed over the course of time between plant/building personnel and utility/trade ally personnel. Fortunately the need for such staff intensive marketing can be justified because there are likely to be large savings from these customers.

4. Maximizing the Ability to Achieve Potential Energy Savings From Improving Energy-Using Systems Through Collaboration with Product Manufacturers, Designers, Engineers, etc.

There is an existing network of experts engaged in providing equipment, designing systems, carrying out installation, and maintaining and repairing energy service equipment. This network represents a ready-made energy-efficiency delivery system if properly employed. Programs that tap this network should attempt to build alliances with trade allies selling different types of equipment and services (e.g. motor vendors, drive system vendors, lighting contractors), so that they can intervene at different places in the sales chain where decisions are made.

One approach to accomplishing this is to design programs that encourage contractor-initiated projects. Puget Sound Power and Light operates a program that encourages commercial lighting contractors to sell their clients efficient lighting systems. Puget reviews the designs and inspects the work, but it does not have to do any of the marketing, system design or auditing.

Other trade ally networks that can be tapped include lighting and heating, ventilation and air condition design firms, equipment vendors, building maintenance firms and heating, ventilation and air condition contractors and engineering firms that specialize in specific industrial processes. If utilities with adjoining service territories collaborate to establish programs that encourage trade ally activities there will be a sufficient number of potential projects to make it worth the allies time and attention to participate.

It is important that utilities work with trade allies and vendors so that their programs influence existing transactions, rather than induce new sales. That is, such programs should be designed to be *market driven*, rather than to drive the market. The advantage of this strategy is that financial incentives can be sized more closely to the incremental replacement cost of energy service equipment and systems, rather than to cover the total cost of new equipment and systems. It is also critical that vendor/trade ally programs be designed to avoid "opportunity sabotage," i.e., the installation of measures that get only a portion of the available savings, while rendering it uneconomical to get the remainder. In the commercial sector, a frequent example of opportunity sabotage occurs when contractors install efficient bulbs and ballasts in a fixture where it is more cost-effective to totally redesign the lighting layout. Opportunity sabotage also often results from rebate programs where utilities pay for equipment without analyzing whether it is the best equipment available. Under many rebate programs, contractors profit most from installing the highest volume of equipment. This leads them to promote measures that require minimal analysis and customer contribution, and are easiest to install. These are often not the measures that provide the most savings.

5. Market Energy Efficiency as Part of a Package of Utility Energy Services

Experience has shown that customers, particularly large commercial and industrial customers, do not view improvements in the energy efficiency of their buildings and facilities from the utility's perspective. These customers have other demands on their time and resources. Consequently, energy-efficiency improvements are frequently undertaken as part of a larger corporate agenda, such as plant modernization, mitigating power quality problems, satisfying more stringent environmental regulations, etc. Utilities and their trade allies will likely be more successful if they market their energy-efficiency projects as part of a package of services that meets the client's more immediate needs than as an isolated proposition. For example, one California utility is surveying its large industrial customers to ascertain what they will be required to do to meet the requirements of the Clean Air Act. The utility then works with these customers to develop energy-efficiency improvement packages that are linked to the scheduled investments needed for air quality enhancements. Another approach, adopted by Central Maine Power, is to offer financing for productivity improvements beyond those directly related to energy efficiency to enhance the competitiveness of its industrial customers.

Summary - Meeting the Challenge

The changed environment in which utilities operate dictates that they revise their approach to the acquisition of energy efficiency. The market they must compete in is not for "low-cost energy," but for "low-cost energy *services*." To remain competitive, a utility must provide not only low rates, but the lowest-cost means of achieving the energy service (e.g. cooking, heating, cooling, pumping, smelting, etc.) the consumer desires. A utility must not only seek to minimize the impact on its electric *rates* of new resource acquisitions, it must also minimize the impact of its resource acquisitions on its customers total energy *bills*. It must also seek to provide "value-added services" to customers that they cannot obtain elsewhere.

The strategy set forth in this paper seeks to reduce both the utilities' cost of acquiring energy efficiency (to minimize its revenue requirements) *and* the total cost to society of the resource acquisition. This strategy is based on the belief that to improve our ability to meet our conservation goals, the next generation of demand-side policies and programs must focus on the transformation of entire market segments while tailoring programs to meet the specific needs of those markets not amenable to transformation. It asserts that utilities collectively -- particularly in collaboration with government -- can permanently transform the market for energy-efficient equipment and services at a lower cost and faster pace than if they operate as individual entities. It also argues for targeting utility and trade ally staff on the lower-cost energy-efficiency gains that are available in large commercial and industrial facilities. Direct personal contact with these customers is not only justified because of the magnitude of the savings potential, but because it is necessary to demonstrate that the utility is providing the most economical energy services rather than just cheap kilowatt-hours.

This strategy does not recommend that traditional utility demand-side management programs can or should be abandoned. Market transformation programs are not the panacea. The transition from capturing conservation through individual utility retail programs must evolve gradually as market transformation ventures are designed and implemented. Indeed, some existing utility energy-efficiency programs will need to be maintained because no workable market transformation venture can be designed or implemented to capture the savings cost-effectively or in a timely fashion. However, in order to minimize conservation acquisition costs, these individual utility programs should primarily be *market driven*. That is, the type and pace of acquisitions should be matched to the resource needs of the utility and naturally occurring market opportunities such as renovations, remodeling and equipment replacements. While, cost-effective lost opportunity resources should be pursued, even during periods of resource surplus, non-lost opportunity resources acquisitions should be deferred until they can be captured as they "naturally occur" because it is generally cheaper and easier to secure these efficiency gains in this fashion.[10]

To minimize transaction costs market transformation programs should be designed to make use of existing infrastructures (manufacturing, distribution and delivery) wherever practical; i.e., we should build bridges not bureaucracies. Furthermore, these ventures should focus first on those markets that are subject to local, states and federal codes and standards and which represent the largest and most economical resources. By targeting markets that are subject to codes and standards, the utility industry has a greater potential for extricating itself from the need to permanently intervene in the market.

If market transformation programs are to succeed, the way their impacts are measured will need to evolve from the current focus on current-year cost and current-year savings. The overt objective of market transformations is to embark upon activities that *permanently* alter the market for a product or service. It is, therefore, critical that evaluations account for both the near-term and long-term effects of these programs. In many cases these evaluations will need to track the gross penetration achieved by a specific technology both prior to market intervention and post market intervention. The impact of the program will need to be based on the total penetration achieved by both direct program participants and indirect program participants (i.e., those non-participants whose actions can be reasonably attributed to the program). That is, the cost-effectiveness of utility investments in market transformation that result in "free riders" must also be adjusted to account for non-participating consumers who make efficiency investments on their own, i.e., "free drivers." In addition, utilities will need to receive credit and/or rate treatment for investments in programs that are explicitly designed to induce market transformation, including support of energy-efficient building codes and appliance/equipment standards.

Another critical component of this strategy would have utilities forming partnerships with the private sector (a.k.a. trade allies, vendors, energy service companies, etc.) targeted at efficiency improvements in market segments that are not addressed by existing utility programs or subject to government actions. The private sector will go where the profits are, so utilities need to work with customers to help make energy management profitable, and with vendors/contractors to make high-quality energy service profitable.

The final element of this strategy addresses the need to market energy-efficiency services as part of a broader range of services available from the utility. This approach attempts to recognize that energy efficiency is only one component of the "energy services" a utility supplies to its customers. Other services, such as providing power quality control or new product information, assisting with environmental control design or equipment financing, etc., may be equally, if not more, important to an individual customer. Recent experience seems to indicate that utilities will likely find more success by marketing their services concurrently rather than independently.

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[10]In some cases the acquisition cost of the conservation savings from non-lost opportunity resources may be sufficiently low to make it economically attractive to develop in order to displace existing generation or develop for "resale."